p-ISSN 1693-1378
e-ISSN 2598-9952

Vol. 22, No. 1, April 2026, pp. 39-51

Equilibrium
JURNAL EKONOMI-MANAJEMEN-AKUNTANSI

The Effect of Remittances on Economic Growth. A Comparative Analysis of Pakistan, Indonesia, and India

Jamshaid Ahmed [a,1*], Erni Achmad [b,2], Yohanes Vyn Amzar [c,3]
[a,b,c] Faculty of Economics and Business, Universitas Jambi, Indonesia
Email: ahmedjamshaid2003@gmail.com*; [2] erniachmad24@gmail.com; [3] yovaz@unja.ac.id
* Corresponding author

ARTICLE INFO

Progress
Received
April 14th, 2026
Revised
May 1st, 2026
Accepted
May 13th, 2026

Keywords
Remittances
Economic Growth
Panel Data
Inflation
Gross Capital formation

ABSTRACT

This study examines the impact of remittance of workers on economic growth in three developing countries Pakistan, Indonesia and India during the period 2010-2024 using panels data analysis. Remittances have become an important source of external finance for a lot of developing economies, and they often are expected to contribute to income growth and development. The objective of this research is to find out whether remittances have a significant impact on economic growth in selected countries. The research is based on secondary data gathered from the World Bank. Economic growth is the Gross Domestic Product (GDP), while the independent variable is the remittances by workers. Gross capital formation and inflation are added as control variables to account for investment and macroeconomic stability. The analysis considers Pooled Ordinary Least Squares and Random Effects panel models and the Hausman test is applied to determine the most appropriate estimation method. The results show that the Random Effects model is the most appropriate specification. The results indicate that there is a positive (albeit statistically insignificant) impact of remittances on economic growth. In contrast, gross capital formation has a positive and significant impact while inflation has a negative effect on economic growth. These results suggest that while remittances provide a contribution to the national income, the contribution of remittances to economic growth is insignificant for the selected countries because it is used for Consumption purposes more as compared to Investment purpose. The study emphasizes the role of productive investment and macroeconomic stability for sustainable growth and recommends that policymakers should promote the more productive use of remittances to support long-term economic development.

1. Introduction

One of the major characteristics of the modern international economy is international migration. The economic performance of the developed and developing countries is seriously influenced by the mobility of workers across the national boundaries. Remittances or money sent back to their home countries by migrant workers is one of the key results of this movement. The said transfers have emerged as a crucial source of foreign funding to most economies, particularly the low and middle income countries (LMICs) (Pradhan et al. 2025). Remittances are significant to these nations because they help to alleviate poverty, boost household earnings and enhance economic stability (Sholehah, et al. 2025). The inflow of remittances throughout the world has been growing at a high pace in the recent past to a marked $656 billion in 2023

p-ISSN 1693-1378
e-ISSN 2598-9952
Equilibrium: Jurnal Ekonomi-Manajemen-Akuntansi
Vol. 22, No. 1, April 2026, pp. 39-51

as compared to $71 billion in 2000. This has transformed remittance to be among the biggest and most consistent sources of international monetary inflows to the developing nations (Yang. 2025).

Where the India is the top remittance recipient in the world, with an estimated $100 billion in remittances in 2022, followed by Mexico ($60.3 billion), China ($51 billion), The Philippines ($38 billion), Egypt ($32.3 billion), Pakistan ($29 billion), France ($25.5 billion), Bangladesh ($21 billion), Nigeria ($20.9 billion), and Vietnam ($19 billion).Even though in 2022 India received approximately USD 100 billion this was only 2.9 percent of its GDP, in over 60 countries remittances are 3 percent or higher of GDP, and in most fragile economies they are above 15 percent and 40 percent, including Tonga (49.9 percent), Lebanon (37.8 percent), Samoa (33.7 percent), Tajikistan (32 percent) and Kyrgyz Republic (31.2 percent) (World Bank. 2023).

The COVID-19 pandemic was a short-term interruption in this growing trend. Remittance flow was first decreased by the travel restrictions, business closures, and job losses among migrant workers. Remittances, however, turned out to be robust, soon enough. They leveled off slightly before returning to their normal course after labor markets opened, and migrants were still able to provide for their families back home. This tenacity was particularly apparent in South Asia, where the inflows of remittances grew by 5.2 percent in 2020, despite the pandemic (Guerrero & Garcia . 2024) . The studies indicate that the rise was prompted by the urge of the migrants to support families struggling with finances as well as the move into formal remittance channels that occurred because of travel restrictions (Abbas et al. 2024). Remittances to LMICs have reached an all-time high of $656 billion in 2023 and it is expected that the figure may increase even higher to $690 billion by 2025.

The importance of these flows is brought out by their large size at the macroeconomic level. The remittances in most developing nations are currently bigger than the official development assistance (ODA) and in most cases they are similar and even more than foreign direct investment (FDI) (Huang. 2025) Consequently, remittances are a key issue of discussion on development. Nonetheless, research in education gives contradictory findings on the connection between remittances and economic growth. In a meta-analysis study, concluded that remittances have a positive impact on economic growth, although it is quite small (Cazachevici et al. 2020). The effectiveness of remittances is strongly determined by country-specific conditions and characterized by the quality of an institutional system, the degree of the financial system development, and the overall conditions of investment (Khan et al. 2025).

One of the most controversial currently is the use of remittances. On the one hand, remittances are primarily used in household consumption, which increases the quality of life and human capital by enhancing health, education, and nutrition (Yang, D. 2025) . On the other hand, whether they are invested in productive activities that raise capital formation and productivity determines the extent to which they can contribute to long-term economic growth (Sholehah, et al. 2025).

The remittances have several functions in the developing countries. They also improve the living standards, alleviate poverty, and enhance access to education and healthcare at the household level. On the national scale, remittances increase income, act as a stable source of foreign exchange, and shield the economies against external shocks (Ratha & Dilip. 2007). Remittances contribute a great percentage of GDP in most of the countries and hence play a major role in the economy.

Although these are the advantages, it is usually seen that high remittance inflows do not necessarily translate into robust economic growth in the long run. Among these issues are the fact that remittances are consumed and not investor, especially in nations that have poor financial systems or even have low investment prospects (Chami, et al. 2005). It has led to a remittance paradox, where large amounts of Remittances do not lead to economic growth on a sustainable basis. This paper analyses this paradox by comparing Pakistan, India and Indonesia- three countries in Asia that have varying economic structure and reliance on remittances. Remittances give Pakistan some of the much-needed foreign exchange particularly during the times of economic instability (Rao, et al. 2025). Table 1.1 shows that remittances constitute a very high proportion of the GDP in Pakistan with 9.4 being the highest in 2024. There is conflicting research evidence on their effects on economic growth. Other studies that employ such models include the Autoregressive Distributed Lag (ARDL) model; some have discovered a positive and significant relationship between remittances coupled with GDP growth on a long-term basis(Shafiq et al. 2025). Another use of remittances is to ease the current account deficit and enhance the balance of payment (Mehmood, et al. 2023).

Still, other research points to the possible adverse effects. According to some studies, remittances have the potential to decrease domestic investment or even cause low economic growth in the long term (Pradhan, et al. 2025). One of the issues is the so-called consumption trap, in which most of the remittance money is used on day-to-day consumption rather than useful investment. Also, Taguchi and Batool (2025) also mention the threat of "Dutch Disease". Massive inflows of foreign currency will lead to appreciation of the exchange rate and will make manufacturing industry less competitive. They find that over 6% of GDP remittances have a negative effect on manufacturing to services ratio whereas over 5% remittances have a negative effect on investment to consumption ratio (Taguchi & Batool, 2025). This suggests that extremely strong remittance inflows can undermine the productive economy.

The absolute number of remittances received by India is the greatest in the world, and it is projected to hit a high of $137.7billion in 2024. Nevertheless, since its economy is large, remittances contribute a very little portion of GDP (approximately 3.5%). The studies in India indicate that there is a more intricate connection between remittances and growth. It was discovered that the remittances start having positive impacts on the growth when they reach a specific threshold (Dastidar, at al. 2022). Remittances are primarily consumed at lower levels although with increase in inflows more are saved and invested. According to the studies of other researchers, remittances positively affect the GDP level of India, though the changes of growth rates are not significant (Poisson & Justin. 2018).This threshold effect contributes to the fact that remittances do not add up to be the key driver of the economic growth of India. Rather, it has grown mainly due to robust domestic investment and massive domestic market. Remittances per worker have also been growing with the growing number of high-skilled Indian migrants in the fields of technology, finance, and healthcare, and this is likely to keep growing even more. This implies that the effects of remittances would be affected by their quantity and quality, as well as the domestic economic conditions (Khan & Imran. 2024).The situation in Indonesia is very different. Domestic investment and consumption have also meant that the country has had consistent and robust economic growth without relying as much on remittances. Remittances contribute to only some 1.1% of the GDP.

This leads to the fact that in most cases there is no significant short term or long-term association in remittances and economic growth in Indonesia (Annisa, et al. 2024). Annisa and Jayadi (2024) undertook their study with the help of Vector Autoregression (VAR) models where their findings indicated that remittances do not have a significant effect on the overall growth performance of Indonesia. Although at the micro-level remittances influence the household consumption level, but at the national level they have a negligible effect on the economy (Prasetyo & Titik. 2025). The development of the middle-class and the high rates of capital investment have instead led to the growth of Indonesia, which favors the development of infrastructure and industrial growth (Afif & syaiful.2020). This example demonstrates that high economic growth does not necessarily have to be heavily dependent on remittances in the condition of the high level of domestic investment. Indonesia has been enjoying a good level of investment that has been supporting the stable growth of the country.

India has a good performance in investment which has contributed to creating a structural change and a high rate of growth. This is however not the case in Pakistan where the level of investment remains low thus reducing the capacity of the country to utilize the remittances in productive development (Pradhan et al. 2025). In addition to investment, the level of macroeconomic stability is a key factor in understanding the effect of remittances on an economy. High and volatile inflation can cause uncertainty and destroy the real value of remittance inflows. The relationship between remittance and inflation is very complex; massive inflows can stimulate demand-pull inflation as it raises aggregate demand for goods and services, especially when this is directed mainly to consumption in an economy facing supply-side constraints (Ratha & Dilip, 2007).

The inflation rates for the three countries show very different environments. Pakistan's high dependency on remittances is corresponded with its chronically high and volatile inflation which peaked at an alarming 30.77% in 2023. This implies that the large inflows of remittances, together with low domestic investment may be adding to inflationary pressures rather than to growth in productive capacity. In contrast, Indonesia and India, where remittances are a much smaller share of its GDP, have had more stable and moderate inflation. Indonesia's inflation has been steadily low, and this has been a predictable environment for the steady growth of Indonesia. India's inflation has been moderate and generally controllable. For these larger, more diversified economies, the flows of remittances are not great enough to destabilize domestic prices to

p-ISSN 1693-1378
e-ISSN 2598-9952
Equilibrium: Jurnal Ekonomi-Manajemen-Akuntansi
Vol. 22, No. 1, April 2026, pp. 39-51

an extent that would allow for effective monetary policy and a healthier investment climate. Therefore, the divergent inflation trajectories, which were partially affected by the relative magnitude of remittance inflows, seem to be an important factor in explaining the economic results experienced by the three nations.

The comparative analysis shows that there are definite differences between the three economies. Pakistan, with high remittance to GDP ratio, faces the problem of poor investment and unstable economic development which is compounded by high constant inflation which reduces the purchasing power of remittance flows and discourages productive investment. In contrast, it is Indonesia that shows that stable, high levels of growth can be achieved without an excessive dependence on remittances but grounded in strong domestic investment and a sustainable low-inflation environment. India occupies a middle ground; as a large, diversified economy with robust internal investment as a growth driver, remittances play a secondary, rather than central, growth role, and moderate inflation supports a more stable economic situation. These divergent outcomes highlight the fact that the economic impact of remittances is not simply determined by the volume of remittances but by how remittances interact with the level of domestic investment and macroeconomic stability, especially inflation. While there are many studies on remittances and growth, there are only a few studies that compare countries with such different structural and macroeconomic contexts. This paper addresses this lack of information by examining the combined impact of remittances of workers on GDP growth in Pakistan, India and Indonesia while considering these important interacting factors.

2. Literature Review

The international empirical literature on the nexus between remittances and economic growth is very extensive, but the findings are inconsistent and often contradictory. The impact of these financial inflows, which have become more important than foreign direct investment (FDI) and official development assistance (ODA) in many low- and middle-income countries appears highly contingent on the quality of the recipient nation's institutions, its financial development and its macroeconomic stability. The scholarly debate can be loosely classified into three views, those discovering a growth linkage, those underlining negative or negligible effects, and a growing consensus that the relationship is conditional and often non-linear. The optimistic view is that remittances directly and indirectly lead to economic growth. At the micro level, they supplement household income, smooth consumption and provide finance for investments in human capital, including in education and healthcare (Maldonado, et al. 2022).

At the macro-level, these inflows represent a stable source of foreign exchange, enhance the creditworthiness of a country, and can stimulate aggregate demand that leads to an increase in production and employment (Ratha & Dilip. 2007). A recent study of 15 East African countries between 2000 and 2022 by Adow (2025) is strong evidence for using the fixed effects and System GMM models, the research showed a high positive link between remittance and GDP per capita growth and concluded that a 1% increase of remittances as a percentage of GDP equates to a substantial increase in economic growth (Adow, A. Abdullahi. 2025a). This is in line with previous cross-country analyses that suggest that remittances can spur growth, especially in economies where a formal credit market is underdeveloped. On the other hand, a more pessimistic stream of literature raises doubts about the possible adverse effects of remittance dependency. Some scholars have claimed that there is a disincentive to labor force participation, leading to a "dependency syndrome," because of large and sustained influx of remittances (Guerrero & Garcia 2024). Furthermore, a sudden increase in remittances can put upward pressure on the domestic price level, a phenomenon discussed by Dahal, Budhathoki and Bhattarai 2024. Their study of South Asian (SAARC) countries found that even though this effect is small, for every 1% rise in remittance income there is a 0.284% rise in inflation in the long run, which may be eroding the real value of these transfers and hurting the competitiveness of the export sector (Dahal et al. 2024).

This demand-pull inflation, together with the possibility of currency appreciation (Dutch disease), can destroy the very growth remittances are expected to promote (Dahal et al. 2024). Bridging these two opposite views is a more subtle body of research that focuses on the importance of mediating factors and contextual conditions. The impact of remittances is not automatic and is channeled and influenced by the domestic economic environment. One important conditioning factor which has been identified in many studies is the level of financial development. A complex and inclusive financial system can be useful in the process of intermediation of remittance inflows, diverting them from simple consumption to productive

investments. A study by Rahmije in 2025 about Western Balkan countries explores this triad with the result that the growth-enhancing potential of remittances is significantly increased in the context of a well-developed financial sector (Topxhiu, et al. 2025).

Similarly, the study on East Africa concluded that financial depth is important to increasing the effectiveness of remittances in fostering economic growth, implying that policies that foster financial inclusion are important for maximizing the developmental impact of these flows Recent studies have also gone beyond the linear models to examine more complex dynamics.

A critical study by Pradhan, Mallick, and Naik (2025) on the BRICS countries (Brazil, Russia, India, China, and South Africa) for the period 1994-2018 proposes a non-linear framework. With a Panel Smooth Transition Regression (PSTR) model, they find strong evidence of threshold effects. Their results suggest that the nexus of remittances and growth is not constant but operates in different "regimes"; the effect of remittances on economic growth changes as the level of remittance inflows crosses certain thresholds (Pradhan et al. 2025). This has been interpreted to mean that at low levels, remittances may be more consumption supporting, but at higher levels, the potential for remittances to generate capital accumulation and growth is greater, if the appropriate institutional framework exists for this to happen.

This non-linear approach is allowing us to make sense of previously conflicting findings in that the relationship itself is dynamic. Finally, the macroeconomic policy regime of a country may dramatically change the relationship between remittances and growth. A very interesting case study written by Nkhoma (2025) examines the effects of remittances on the economic growth of Zimbabwe from 1985 to 2023 in the context of dollarization. Using Autoregressive Distributed Lag (ARDL) model, the study finds that remittances have statistically significant and positive impact on long run economic growth. It is interesting to note how the interaction between remittances and dollarization was positive, which suggests the macroeconomic stability that the dollarized regime provided boosted the growth-inducing potential of remittance flows by offering a stable store of value and medium of exchange (Nkhoma, Ryne Sammy. 2025). However, the study also shows the trade-offs, as dollarization negatively affected growth in the short run, probably because of the constraints on monetary policy autonomy including the choice of monetary system (Nkhoma & Sammy. 2025).

This research highlights the fact that although remittances can serve as an important stabilizing force in the global economy, any benefits to sustainable growth are intimately linked with the overall institutional and policy environment, In summary, contemporary literature points to the fact that the utilization of remittances for long-term development requires a holistic policy approach, which is based on preserving macroeconomic stability, enhancement of financial inclusion and improvement of institutional quality.

2.1. Conceptual Framework

Based on the Literature underpinnings and the review of previous studies, this research proposes a conceptual framework to analyze the relationship between remittances and economic growth. The framework states that remittances (independent variable) have direct effect on economic growth (dependent variable). However, this relationship is not straight and is influenced by key macroeconomic control variables, i.e., Gross Capital formation and Inflation. These variables can either strengthen or weaken the growth-promoting effects of remittances. The proposed relationships for testing in this study are displayed in the diagram below.

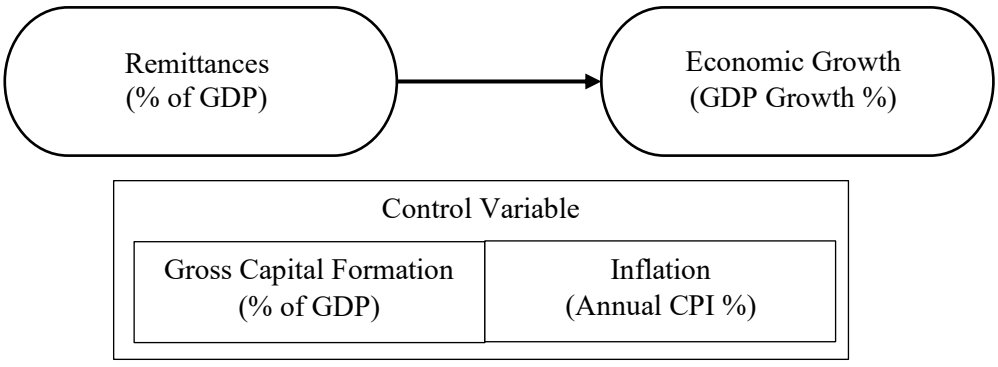

Figure 1: *Conceptual Framework of Remittances and Economic Growth.*

p-ISSN 1693-1378
e-ISSN 2598-9952
Equilibrium: Jurnal Ekonomi-Manajemen-Akuntansi
Vol. 22, No. 1, April 2026, pp. 39-51

2.2. Hypotheses

Hypotheses of this research are

H_1: Remittance inflows have important and positive direct effect on economic growth in Pakistan, India and Indonesia.

H_2: Gross capital formation has a significant and positive impact on the economic growth of Pakistan, India, and Indonesia.

3. Research Methodology

The research design in this paper is a quantitative panel data study that aims to identify the impact of remittances by workers on the economic growth and to determine whether this effect varies among 2010-2024 in Pakistan, India and Indonesia. It is based on a panel-structured secondary data of the three countries observed across fifteen years. The use of panel data is suitable since the study can trace changes in the economy over a period while adjusting the differences between countries in the model.

The estimation of a baseline panel regression model is used to address research questions to quantify the overall effect of remittances, investment and Inflation on economic growth. All the data have been sourced using valid credentials of the world bank (WDI), IMF, state bank of Pakistan, reserve bank of India and bank of Indonesia. The data constitutes a balanced panel of 45 observations (3 countries and 15 years), and it is appropriate to use the panel econometric methods to obtain consistent and reliable results, including the Fixed Effects and Random Effects models.

The research question is answered in this study in one size analysis that is a panel data regression model.

$$GDPG_{it} = \alpha + \beta_1 REM_{it} + \beta_2 INV_{it} + \beta_3 INFL_{it} + \mu_i + \varepsilon_{it}$$

The model gives the mean impact of remittances, investment and Inflation on the economic growth of Pakistan, India, and Indonesia as a combination. The country-specific effect (μ_i) corrects the structural difference between countries like institutions, policies, and economic structure. A few of the econometric methods will be used in this research to ensure that sound panel regression results are obtained. To test the characteristics econometric unit root tests will be performed first, as non-stationary data might result in the spurious regression outcomes. Consequently, the tests that will be utilized in testing the stability of the data of the three countries namely Pakistan, India, and Indonesia will include the Levin-Lin-Chu Test as well as the Im-Pesaran-Shin Test. Once stationarity is ascertained, both Fixed Effects and the Random Effects Model of panel data regression will be estimated to estimate the average influence of remittances, investment and inflation on GDP growth across nations. The model will capture effects that are country-specific to take into consideration the unobserved features that can affect economic growth. To decide the model is more suitable, the Hausman Test will be used. In case the test of Hausman is statistically significant, then the Fixed Effects model will be chosen otherwise the Random Effects model will be utilized. Lastly, effective standard errors will be used to adjust any potential errors, including heteroskedasticity and serial correlation in the panel data to make the inference based on the statistical results more trustworthy. To ascertain the variation in the effects of remittances among countries, the base model is further elaborated by introducing interaction terms between remittances on the one hand, and country dummy variables, on the other hand:

$$GDPG_{it} = \alpha + \beta_1 REM_{it} + \beta_2 INV_{it} + \beta_3 INFL_{it} + \gamma_1 (REM_{it} \times D_{PAK}) + \gamma_2 (REM_{it} \times D_{IND}) + \mu_i + \varepsilon_{it}$$

This model is such that the remittance effect can be different in Pakistan, India and Indonesia. When the interaction coefficients are not significant it does not mean that the effects of remittances on growth are identical in all countries, so we use dummy variables analysis to find the difference among countries regarding Remittances.

4. Result and Discussion

In this part by using E-views software I will present an empirical detailed, narrative explanation of the empirical findings from the panel analysis of economic growth, remittances, Investment and inflation for the three countries: Pakistan, India, and Indonesia. I describe what each set of test results means for the reliability of the regression estimates, how the core variables behave over time, and the implications for interpretation and policy. I then discuss diagnostics and robustness, highlight potential econometric caveats,

and offer suggestions for how the results should be read and used. First, the unit root testing establishes the time-series properties of each variable and therefore dictates how each series may be used in regression.

The dependent variable, GDP growth (GDPG), was shown to be stationary in levels: all panel unit-root tests produced p-values below the 5% threshold (LLC p = 0.0008; IPS p = 0.0211; ADF-Fisher p = 0.0268; PP-Fisher p = 0.0012). Practically, this means GDP growth behaves like a stationary rate fluctuating around a constant Mean rather than exhibiting a persistent stochastic trend. Economically this is sensible: growth rates typically oscillate with business cycles and shocks and revert to an average growth path. Because GDPG is I (0), it can be entered into the regression in levels without differencing; doing so preserves the direct economic interpretation of coefficients as the effect on the growth rate.

By contrast, remittances (REM) were not stationary in levels but became stationary after first differencing. All tests strongly rejected the unit-root null at the first difference (LLC p ≈ 0.0000; IPS p = 0.0003; ADF-Fisher p = 0.0008; PP-Fisher p = 0.0022), so REM is integrated of order one, I (1). This indicates that absolute remittance levels exhibit a trend behavior over time (for example, a steady increase in remittance inflows driven by migration trends, wage differentials, or exchange rate movements), whereas the changes in remittances are stable. For regression practice, this implies that using the first-differenced remittance variable or otherwise treating the trend (e.g., detrending or including time effects) is necessary to avoid spurious inference if the model mixes non-stationary series with stationary ones. In short, the impact of changes in remittances is the statistically meaningful quantity in this panel. Gross capital formation (GCF) displayed the strongest trending behavior: it required second differencing to achieve stationarity.

Panel tests at second difference reject the null of unit root with highly significant p-values (LLC p = 0.0001; IPS p = 0.0002; ADF-Fisher p = 0.0007; PP-Fisher p = 0.0000), implying GCF is I (2). Economically, this pattern is consistent with long-term accumulation of physical capital investment tends to grow over decades with structural development, and its level is strongly influenced by long-run development trends and policy. For modelling, and I (2) variable presents more complexity: including it in levels alongside I (0) or I (1) variables risk invalid inference unless co-integration or appropriate differencing/dynamic specifications are used. The finding here suggests the researcher must be cautious in assuming a level effect from GCF on GDP growth without addressing the differing orders of integration (for example, by modelling short-run changes in Investment or applying cointegration/ECM methods if a long-run equilibrium is plausible).

Inflation (INF) was found to be I (1): the first differences are stationery (LLC p = 0.0456; IPS p = 0.0090; ADF-Fisher p = 0.0119; PP-Fisher p = 0.0001). This means the inflation rate series shows trend-like or persistent movement in levels, and it is the change in inflation (or the first difference) that has stable properties. From an economic perspective, inflation is driven by monetary policy, demand–supply shocks, and external factors; its fluctuations can be persistent, but changes (acceleration/deceleration) are what tend to matter for short-run macroeconomic outcomes. For the regression, treating inflation as I (1) indicate that either differencing or otherwise accounting for persistence is necessary to make correct statistical statements about its effect on GDP growth.

Taken together, the unit-root results require careful treatment in the regression stage: GDP growth is I (0), while remittances and inflation are I (1), and investment is I (2). The researcher must therefore justify how variables with different integration orders are combined. In the reported analysis the regression proceeded with the panel specification that includes remittances, Investment and inflation alongside GDP growth; the implications of mixed orders of integration should motivate use of first/second differences for the I(1)/I(2) regressors or the application of panel cointegration techniques if the researcher is interested in long-run relationships. The subsequent estimation and diagnostics therefore need to be interpreted considering these time-series properties.

Table 1. Pooled Ordinary Least Squares (OLS) Estimation Results

Variables	Coefficient	Probability	Results
C	-2.78	0.39	Insignificant
REM	0.620	0.06	Insignificant
INV	0.238	0.00	Significant
INFLA	-0.165	0.10	Insignificant

Source: *Author*

p-ISSN 1693-1378
e-ISSN 2598-9952
Equilibrium: Jurnal Ekonomi-Manajemen-Akuntansi
Vol. 22, No. 1, April 2026, pp. 39-51

The pooled OLS benchmark provides an initial, unconditional look at associations across all observations without accounting for unobserved heterogeneity. In the pooled estimator, Investment has a positive and statistically significant association with GDP growth (coefficient ≈ 0.2382, p = 0.007), indicating that a one percentage point rise in GCF is associated with roughly a 0.24 percentage point increase in GDP growth, ceteris paribus. Remittances show a positive coefficient (≈ 0.6201) that is marginally insignificant at the 5% level (p = 0.0635), suggesting a positive but weak relationship under the pooled assumption. Inflation shows a negative coefficient (≈ −0.1650) but is not statistically significant (p = 0.1005) in the pooled model. The pooled intercept is negative and insignificant. However, pooled OLS rests on the strong assumption that all countries and years share identical structural characteristics; given the clear country- and time-specific dynamics normally present in macro panels, pooled OLS functions mainly as a point of comparison rather than the preferred estimator. Diagnostic testing makes that point starkly: the Breusch–Pagan Lagrange Multiplier (LM) test rejects the pooled OLS assumption of no panel effects. The LM test statistic for "Both" effects (cross-section and time) yields a p-value of 0.0000, driven especially by a very strong time effect (time LM p = 0.0000). This result means there are significant unobserved effects, especially period-specific influences—that are omitted by pooled OLS and that the panel structure matters. Economically, large time effects are sensible for macro panels covering multiple countries across many years because global shocks, commodity cycles, and synchronized business cycles can generate common time variation. Consequently, the analysis appropriately moves to panel estimators that account for unobserved heterogeneity.

Table 2. Comparison of Pooled OLS and Random Effects Model (REM)

Variables	Coefficient	Std. Error	t-Statistic	Probability	Results
C	-3.12	1.88	-1.66	0.1047	Insignificant
REM	0.81	0.19	4.33	0.0001	Significant
INV	0.25	0.05	5.36	0.0000	Significant
INFLA	-0.26	0.07	-3.92	0.0003	Significant

Source: *Author*

The Random Effects Model (REM), estimated by EGLS, produces substantively stronger and statistically significant results. REM shows remittances with a positive and highly significant coefficient of about 0.8134 (t-statistic ≈ 4.334, p = 0.0001): in this estimator, a one percentage point increase in remittances is associated with roughly a 0.81 percentage point increase in GDP growth, conditional on other regressors.

Investment remains positive and highly significant (coefficient ≈ 0.2496, p ≈ 0.0000), very close in magnitude to the pooled estimate but more precisely estimated. Inflation has a negative and significant effect under REM (coefficient ≈ −0.26095, p = 0.0003), and the magnitude is larger than in the pooled model. These REM findings suggest that once unobserved individual (period) effects are accounted for and treated as random, remittances, investment and inflation display clear and statistically robust relationships with GDP growth: remittances and investment stimulate growth while inflation depresses it. Choosing between FEM and REM is addressed by the Hausman test.

Table 3: Hausman Test for Model Selection

Chi-Square Statistic	2.431031
Degree of Freedom	3
Probability	0.49 (Significant)

Source: *Author*

The reported Hausman χ^2 statistic is 2.4310 with 3 degrees of freedom and a p-value of 0.4879. Because the p-value is well above 0.05, the null hypothesis (that the random effects estimator is consistent and efficient) is not rejected. In plain terms, there is no statistical evidence that unobserved effects are correlated with the regressors; hence REM provides efficient estimates and is preferred over FEM for this dataset. The Hausman comparison of coefficient pairs shows small and statistically insignificant differences (for remittances, FE = 0.8509 vs RE = 0.8134; for GCF, FE = 0.2516 vs RE = 0.2496), which further supports retention of REM. Practically, this means the assumptions underlying REM appear acceptable: the unobserved heterogeneity can be treated as random from the perspective of the measured explanatory variables. Before accepting coefficient magnitudes and policy messages, it is essential to consider classical

assumption diagnostics. Multicollinearity is a concern when regressors are highly correlated; the pairwise correlations reported show a strong negative correlation between Investment and remittances ($r = -0.842235$). This correlation exceeds conventional cautionary thresholds ($|r| > 0.80$) and suggests potentially serious multicollinearity between these two explanatory variables but still we can continue meanwhile it is less than 10. High multicollinearity inflates standard errors, reduces the precision of coefficient estimates, and complicates isolation of individual variable effects. Although the other pairwise correlations (GCF–INF ≈ -0.4388; INF–REM ≈ 0.5992) are moderate, the strong negative GCF–REM correlation warrants attention. The practical implication is that the growth effect attributed to remittances and to investment may be entangled: when investment rises, remittances tend to fall (or vice versa), so the estimated partial effects could be sensitive to model specification. Remedies could include checking Variance Inflation Factors (VIFs), re-specifying the model (for example, using principal component or ridge-type approaches), or estimating models that enter one of the pair as changes rather than levels. Given the earlier unit-root results, modelling differences for REM and Investment are also conceptually consistent and may alleviate multicollinearity. Cross-section dependence and serial correlation diagnostics indicate further econometric complications. The Breusch–Pagan LM, Pesaran scaled LM, and Pesaran CD tests all reject the null of no cross-section dependence (all $p = 0.0000$). This outcome means the residuals across the three countries are correlated: shocks in one country are statistically linked to shocks in the others. In macro panels of countries that trade or share regional linkages, cross-sectional dependence is unsurprising. However, it has important consequences: standard errors that ignore cross-dependence will be biased, and t-statistics can be misleading.

Remedies include using robust covariance estimators that allow for cross-sectional correlation (for example, Driscoll–Kraay standard errors, clustered standard errors, or two-way clustering) or explicitly modelling common factors (common correlated effects estimators) to capture cross-country spillovers. Given the strong evidence of cross-section dependence, the interpretation of statistical significance in the REM should be tempered unless robust standard errors that address cross-section dependence are employed. Heteroskedasticity testing via the cross-section heteroskedasticity LR test returned a p-value of 0.1219, so the null of homoscedastic residuals is not rejected at conventional levels. In other words, the LR test does not indicate cross-sectional heteroskedasticity in the pooled OLS residuals. Nevertheless, the combination of cross-section dependence and the presence of highly correlated regressors suggests it is prudent to report heteroskedasticity-robust standard errors in any final reporting.

Robust standard errors protect inference against a range of specification issues (heteroskedasticity and some forms of serial correlation) and are thus a recommended precaution. The study's earlier note that "robust standard errors are used" aligns with good practice even when a particular heteroskedasticity test is not significant, robust inference improves confidence in p-values. Synthesizing these findings, the econometric evidence points to a consistent narrative: investment (GCF) has a positive and robust association with growth; remittances appear to contribute positively to growth once panel effects are accounted for; and inflation tends to depress growth. However, several important caveats qualify this conclusion.

First, the differing integration orders GDPG I (0), REM and INF I (1), GCF I (2) imply the need for caution about level regression: if long-run relationships are of interest, cointegration testing and error-correction modelling should be considered to separate short-run dynamics from long-run equilibria.

Second, the high negative correlation between GCF and REM suggests identification challenges: the estimated partial effect of remittances could shift if the specification changes or if one enters variables in differences.

Third, significant cross-section dependence indicates that regional or global shocks matter and that standard errors must be adjusted for cross-country correlation to make reliable inferences. Fourth, the panel has only three cross-sections; while time dimension may be long, a small number of countries constrain the generalizability of statistical tests and limit the degrees of freedom for cross-sectional inference.

Lastly, potential endogeneity remains a concern remittance could be endogenous to growth or to unobserved country events so methods that address endogeneity (instrumental variables, system-GMM for dynamic panels, or natural experiments) could strengthen causal claims.

p-ISSN 1693-1378
e-ISSN 2598-9952
Equilibrium: Jurnal Ekonomi-Manajemen-Akuntansi
Vol. 22, No. 1, April 2026, pp. 39-51

4.1. Results and Discussion of Panel Regression with Interaction Dummy Variables

To test the hypothesis that remittances have varying effects on the economic growth of different countries, this study approximated a panel regression model where interaction dummy variables are used to denote Pakistan and India as the country of focus whereas Indonesia is considered as the base country. Besides the remittances and gross capital formation, inflation was also used as an additional macroeconomic control variable to give a more thorough analysis. The estimation of the model was done on a period of 2010-2024 and included three countries; the total number of observations of the panel is 45 balanced panel. This specification enables the effect of remittances on the GDP growth of countries to differ as compared to a homogenous effect.

Table 3: Panel Regression Results with Interaction Effects

Variable	Coefficient	Std. Error	t-Statistic	Probability	Results
Constant (C)	-1.47	4.46	-0.33	0.74	Insignificant
REM	-0.27	1.93	-0.14	0.89	Insignificant
INV	0.22	0.099	2.23	0.03	Significant
INFL	-0.19	0.11	-1.73	0.09	Insignificant
REM × India Dummy (REM_DIND)	0.69	1.56	0.44	0.66	Insignificant
REM × Pakistan Dummy (REM_DPAK)	0.86	1.51	0.57	0.57	Insignificant

Source: *Author*

Based on the estimation results, the regression equation can be written as:

$$GDPG_{it} = -1.47 - 0.26REM_{it} + 0.21NV_{it} - 0.19INFL_{it} + 0.69(REM_{it} \times D_{PAK}) + 0.85(REM_{it} \times D_{IND})$$

The probability value of the coefficient of remittances (REM) is 0.8916 and the value of the coefficient is -0.2661, which is more than 5 percent significance level. This coefficient is the impact of the remittances on the economic growth of Indonesia, given that the base country is Indonesia. The negative sign shows that remittances are likely to lower the GDP growth in Indonesia, but the impact is not statistically significant. It means that the variations in remittance inflows do not play a significant role in influencing economic growth in Indonesia over the course of study. It could be attributed to the fact that remittances are largely spent on households instead of productive investment thus limiting their effectiveness on capital formation and long run growth. There is a positive coefficient of 0.2199 with a probability value of 0.0316 between investment (INV) and probability which is statistically significant at the 5 percent level.

This finding implies that investment contributes positively and significantly to the growth of the economies of the chosen countries. To be more precise, one unit of growth of Investment GDP by about 0.22 units and things equal. This observation agrees with the economic growth theory that stresses the significance of accumulation of capital in increasing productive capacity, creating more job opportunities, increasing the overall economic performance. The negative coefficient of Inflation (INFL) is -0.1901 with probability value of 0.0908. This is insignificant in the 5 percent level but significant in the 10 percent level. This means that the increased inflation is likely to lower growth in an economy. The negative correlation implies that macroeconomic instability, price escalation and poor purchasing power would demoralize investment and deteriorate economic performance.

As such, stabilization in the prices seems to be meaningful to the continued economic growth in these nations. The coefficient of interaction amongst remittances and India dummy (REM x DIND) is positive and though not significant (p = 0.6600). To get the overall effect of remittances in the economic growth of India, one should add the base coefficient to the interaction coefficient: -0.2661 +0.6925 =0.4264. This finding shows that the total positive impact of remittances on the economic growth in India is positive, but the impact is not statistically significant.

This is an indication that remittances in India can help in various economic activities, including small scale investment, entrepreneurship, or human capital formation, but their macroeconomic effect is not as strong as to have a significant effect on GDP growth over the period of study. Likewise, the coefficient of interaction between remittance and Pakistan dummy (REM × DPAK) is a positive value of 0.8566 with a probability value of 0.5736, which is statistically insignificant. The overall impact of remittances on the

Pakistani Economic development is found to be = -0.2661 / 0.8566 = 0.5905. This implies that remittances influence the growth of the Pakistani economy positively and with a statistically insignificant impact.

The fact that the coefficient is relatively higher than in India suggests that the remittances could contribute a little more to the economic activities of Pakistan which could be in the form of business financing, house-building investment or in the form of bolstering household income. Overall, the findings indicate that the impact of remittances on the growth of the economy varies in different nations. Although it is seen that remittances have negative effects in Indonesia and positive effects in Pakistan and India, none of the effects are statistically significant. Conversely, the growth of the capital formation is the most significant statistically significant determinant of the economic growth in the model, whereas the impact of the inflation is negative at the 10 percent level of significance. These results imply that investment is more decisive in economic growth when compared to remittances between the year 2010 and 2024. Moreover, the relatively small explanatory power of the model means that other macroeconomic variables, including trade openness, government expenditure, institutional quality, and financial development, can also influence economic growth but not have been modelled in the specification.

5. Closing

5.1. Conclusions

In this paper, the authors attempted to examine how Remittances, Investment and Inflation influence the economic growth of Indonesia, Pakistan, and India by considering 2010-2024 panel data. The paper also investigated the question of the varying effects of remittances depending on the country by the inclusion of interaction dummy variables. Resting on the obtained empirical results of the regression of panel data, a few significant conclusions may be created.

a. Panel data analysis (2010–2024) using the Random Effects Model shows that Investment has a positive and statistically significant impact on economic growth, highlighting the crucial role of investment in expanding productive capacity, infrastructure, and employment. This result remains robust after correcting for heteroskedasticity. Inflation, on the other hand, has a negative and weakly significant effect, indicating the importance of macroeconomic stability. Remittances show a positive but statistically insignificant impact, suggesting they are largely used for consumption rather than productive investment.
b. The interaction dummy results reveal differences across countries. In Indonesia, remittances have a negative but insignificant effect on economic growth, implying limited productive use. In contrast, Pakistan and India show a positive but still insignificant impact, indicating a marginal role of remittances in supporting small-scale activities or income smoothing. Overall, remittances do not significantly contribute to economic growth in the three countries during the study period.

5.2. Suggestions

Based on the findings of this study for the period 2010–2024, several suggestions can be proposed for governments and future researchers. Since investment has a significant impact on economic growth while remittances do not, appropriate policies are needed to promote investment and encourage the productive use of remittances in Indonesia, Pakistan, and India.

a. Since remittances are the focus of this study but show a positive yet insignificant impact on economic growth, governments need to design policies that promote their productive use. Although remittances increase household income, they are often spent on daily consumption such as food, housing, and basic needs. While this improves living standards, it does not directly contribute to long-term economic growth. Therefore, governments should encourage recipients to allocate a portion of remittances toward productive sectors like small businesses, agriculture, and entrepreneurship. This can be done through training programs, incentives, and awareness campaigns that highlight the benefits of investment over consumption.
b. Financial institutions also play a key role in transforming remittances into productive capital. Banks and microfinance institutions should introduce tailored financial products such as special savings accounts, micro-investment plans, and small business financing schemes specifically designed for remittance recipients. These financial tools can help individuals save, invest, and expand their income-generating activities. Additionally, improving financial literacy will enable recipients to manage their funds more effectively and make better economic decisions.

p-ISSN 1693-1378
e-ISSN 2598-9952
Equilibrium: Jurnal Ekonomi-Manajemen-Akuntansi
Vol. 22, No. 1, April 2026, pp. 39-51

c. Governments should prioritize maintaining macroeconomic stability, particularly by controlling inflation and promoting investment. The study shows that gross capital formation has a strong positive effect on economic growth, while inflation negatively impacts it. High inflation reduces purchasing power, creates uncertainty, and discourages investment. Therefore, stable economic policies, efficient monetary management, and support for both domestic and foreign investment are essential to sustain economic growth.
d. Future researchers are encouraged to expand this study by including additional variables such as education, financial development, institutional quality, or technological progress, which may influence the relationship between remittances and economic growth. Using a larger dataset, longer time periods, or different econometric methods could also provide deeper insights. This will help to better understand the long-term impact of remittances and identify conditions under which they can significantly contribute to economic growth.

References

Abbas, Syed Ali., Selvanathan, Eliyathamby A., and Selvanathan, Saroja. (2024). Impact of COVID-19 on Migrant Remittances in South Asia. *Applied Economics* 56 (60): 9046–59. https://www.tandfonline.com/doi/abs/10.1080/00036846.2023.2297740

Adams Jr, Richard H. and Cuecuecha, Alfredo. (2010). The Economic Impact of International Remittances on Poverty and Household Consumption and Investment in Indonesia. *World Bank Policy Research Working Paper*, no. 5433. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1683904

Adow, Abdirahman Abdullahi. (2025). Remittances and Economic Growth in East Africa. *Cogent Economics & Finance* 13 (1): 2461604. https://www.tandfonline.com/doi/abs/10.1080/23322039.2025.2461604

Cazachevici, Alina., Havranek, Tomas., and Horvath, Roman. (2020). Remittances and Economic Growth: A Meta-Analysis. *World Development* 134 (October): 105021. https://doi.org/10.1016/j.worlddev.2020.105021.

Chami, Ralph., Fullenkamp, Connel., and Jahjah, Samir. (2005). Are Immigrant Remittance Flows a Source of Capital for Development? *IMF Staff Papers* 52 (1): 55–81. https://link.springer.com/article/10.2307/30035948

Dahal, Arjun Kumar., Budhathoki, Prem Bahadur., and Bhattarai, Ganesh. (2024). Exploring the Impact of Remittance and Economic Growth on Inflation. *SocioEconomic Challenges (SEC)* 8 (2). https://armgpublishing.com/journals/sec/volume-8-issue-2/article-8/

Dastidar, S. G. and N. Apergis. (2022). Do Remittances Promote Economic Growth? New Evidence from India. *Economic Issues Journal Articles* 27 (1): 11–37. https://economicissues.org.uk/Files/2022/EI_March2022_dastidar.pdf

Giuliano, Paola. and Ruiz-Arranz, Marta. (2009). Remittances, Financial Development, and Growth. *Journal of Development Economics* 90 (1): 144–52. https://www.sciencedirect.com/science/article/pii/S0304387808001077

Huang, United. (2025). World Economic Situation and Prospects: November 2025 Briefing, No. 196. Text. United Nations, November 4. United Nations (organization). https://policy.desa.un.org/publications/world-economic-situation-and-prospects-november-2025-briefing-no-196.

Khan, Ahsan Aslam., Helmi Bin Hidthir, Mohammad., Mansur, Mustazar., and Ahmad, Zaki. (2025). Role of Financial Inclusion in Enhancing the Effect of Remittance on Economic Growth in Developing Countries. *Cogent Economics & Finance* 13 (1): 2476093. https://www.tandfonline.com/doi/abs/10.1080/23322039.2025.2476093

Khan, Imran. (2024). Analyzing the Impact of Positive and Negative Remittance Inflow Shocks on Economic Growth of India. *Journal of Economic Studies* 51 (2): 338–56. https://www.emerald.com/jes/article-abstract/51/2/338/1234402

Maldonado, René. and Harris, Jeremy. (2022). *Remittances to Latin America and the Caribbean in 2021. Migrant Efforts during the COVID-19 Crisis*. https://publications.iadb.org/en/remittances-latin-america-and-caribbean-2023

Maune, Alexander. (2025). Financial development, Trade, Remittances, and Economic growth: The

Governance Perspective. *Journal of Governance and Regulation/Volume* 14 (1).

Mehmood, M.N., Mahfooz, S.Z., Mehmood, N.Q., and Ali, I. (2023). Analysis of WDI Data to Investigate the Impact of Foreign Remittances on the Economic Growth of Pakistan. *World Journal of Advanced Research and Reviews* 19 (3): 589–94.

Nkhoma, Ryne Sammy. (2025). *Analyzing the Effectiveness of Remittances on Economic Growth in a Dollarized Economy: Case Study Zimbabwe*. portal.org/smash/record.jsf?pid=diva2:1986573

Pradhan, Kalandi Charan., Mallick, Lingaraj., and Naik, Kalu. (2025). Remittance and Economic Growth Nexus in BRICS Countries: Evidence from PSTR with Endogeneity. *Research in Economics* 79 (2): 101032. https://www.sciencedirect.com/science/article/pii/S1090944325000092

Rao, Nitya., Sathe, Reema., and Grist, Natasha. (2025). Gender, Intersectionality and Climate Smart Agriculture in South Asia: A Review. *PLOS Climate* 4 (2): e0000482. https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000482

Rashid, Muhammad Khalid., Shaffaq, Shafiq., and Rehman, Muhammad Atiqur. (2025). Assessing the Impact of Migrant Worker's Remittances on GDP Growth: An Empirical Study on The Economy of Pakistan. *Contemporary Journal of Social Science Review* 3 (3): 1430–36. https://doi.org/10.63878/cjssr.v3i3.1122. https://contemporaryjournal.com/index.php/14/article/view/1122.

Shapiro, David., MacDonald, Daniel., Steven, A., Greenlaw., Shapiro, David. (2022). 11.4 Shifts in Aggregate Demand - Principles of Macroeconomics 3e. OpenStax, December 14. https://openstax.org/books/principles-economics-3e/pages/24-4-shifts-in-aggregate-demand.

Sholehah, Fithaloka Hartinawati. and Samputra, Palupi Lindiasari. (2025). The Effect of Migrant Worker Remittances on Economic Growth in Low-and Middle-Income Developing Countries: A Systematic Literature Review. *Asian Journal of Engineering, Social and Health* 4 (7): 1064–77. https://ajesh.ph/index.php/gp/article/view/597

Taguchi, Hiroyuki. and Batool, Bushra. (2025). Threshold Effects of Emigrant's Remittances on Dutch Disease and Economic Growth in Pakistan. *Economies* 13 (6): 156. https://www.mdpi.com/2227-7099/13/6/156

Topxhiu, Rahmije Mustafa. and Krasniqi, Florentina Xhelili. (2025). Remittances, Financial Development and Economic Growth-A Dynamic Panel Data Approach. *Contemporary Economics* 19 (2). https://www.ceeol.com/search/article-detail?id=1365011

Yang, D. (2025). International Migration, Remittances, and Economic Development. *NBER*. https://www.nber.org/reporter/2025number1/international-migration-remittances-and-economic-development.